

U.S.S.N. 09/235,875

Filed: January 22, 1999

## AMENDMENT AND RESPONSE TO OFFICE ACTION

## In the Claims

1. (currently amended) A method for the biological production of polyhydroxyalkanoate containing 3-hydroxyhexanoate comprising providing genetically engineered bacteria expressing a 3-ketothiolase gene encoding an enzyme that converts butyryl-CoA and acetyl-CoA to ~~beta-ketohexanoyl-CoA~~ 3-ketohexanoyl-CoA, a reductase gene that encodes an acetoacetyl-CoA reductase enzyme that converts ~~beta-ketohexanoyl-CoA~~ 3-ketohexanoyl-CoA to ~~beta-hydroxyhexanoyl-CoA~~ 3-hydroxyhexanoyl-CoA, and a PHB or PHA synthase gene that encodes a polyhydroxyalkanoate (PHA) polymerase that polymerizes 3-hydroxybutyryl-CoA and 3-hydroxyhexanoyl-CoA, wherein the enzymes are expressed in a sufficient amount to produce polyhydroxybutyrate-co-3-hydroxyhexanoate and wherein the bacteria can utilize butanol or butyrate.

Claims 2-5 canceled.

6. (previously presented) The method of claim 1 wherein the polyhydroxyalkanoate (PHA) polymerase gene is incorporated into the bacterial chromosome.

7. (currently presented) The method of claim 1 for producing a copolymer of 3-hydroxyhexanoate comprising providing a polyhydroxyalkanoate (PHA) polymerase gene from a ~~bacteria~~ bacterium selected from the group consisting of *Aeromonas caviae*, *Comamonas testosteroni*, *Thiocapsia pfenigii*, *Chromatium vinosum*, *Bacillus cereus*, *Nocardia carolina*, *Nocardia salmonicolor*, *Rhodococcus ruber*, *Rhodococcus rhodocrous*, and *Rhodospirillum rubrum*.

Claims 8-9 canceled.

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10. (currently amended) The method of claim ~~4~~ 19 wherein the bacteria further ~~comprises~~ comprise a gene encoding  ~~$\beta$ -hydroxyacyl-ACP-coenzyme A~~ 3-hydroxyacyl-ACP-coenzyme A transferase.

Claims 11-13 canceled.

14. (previously presented) The method of claim 1 wherein the bacteria is selected from the group consisting of *E. coli*, *Klebsiella*, *Ralstonia*, *Alcaligenes*, *Pseudomonas*, and *Azotobacter*.

Claim 15 canceled.

16. (currently amended) The method of claim 1 wherein the bacteria ~~expresses~~ express a gene encoding a D-specific enoyl-CoA hydratase.

17. (currently amended) The method of claim 1 wherein the bacteria ~~expresses~~ express a ~~PHB biosynthetic thiolase~~, three enzymes from *C. acetobutylicum* that form butyryl CoA; ~~thiolase specific for 3-ketohexanoyl CoA~~, reductase specific for 3-ketohexanoyl CoA, and a ~~polyhydroxyalkanoate (PHA) polymerase that accepts both 3-hydroxybutyryl CoA and 3-hydroxyhexanoyl CoA.~~

18. (currently amended) The method of claim 1 wherein the bacteria ~~expresses~~ express one or more fatty acid biosynthetic enzymes.

19. (currently amended) The method of claim 18 wherein the fatty acid biosynthetic enzymes convert 3-hydroxyacyl-ACP to 3-hydroxyacyl-CoA.

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20. (currently amended) The method of claim 19 where the enzymes are selected from the group consisting of ~~ACP-CoA transacylase~~ 3-hydroxyacyl-ACP-coenzyme-A transferase, acyl-ACP thioesterase, and acyl-CoA synthase.

21. (original) The method of claim 20 wherein the enzymes are acyl ACP thioesterase and acyl CoA synthase.

Claims 22-34 canceled.

35. (new) The method of claim 18 wherein the enzymes are from *E. coli*.

36. (new) The method of claim 18 wherein the enzymes form a complex.

37. (new) The method of claim 18 wherein the enzymes are from *Nocardia salmonicolor*.

38. (new) The method of claim 18 wherein the enzyme epimerizes S-3-hydroxyhexanoyl-CoA to R-3-hydroxyhexanoyl-CoA.

39. (new) The method of claim 38 wherein the enzymes are from the *Pseudomonas putida* FaoAB complex.